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PATENT SPECIFICATION

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Index at acceptance:—Class 38(v), B1r(1d1:8b), B1r13(c:g;j), B2b1

COMPLETE SPECIFICATION

Improvements in and relating to Electromagnetic Relays

We, N.V. PHILIPS' GLOEILAMPENFABRIEKEN, a limited liability Company, organized and established under the laws of the Kingdom of the Netherlands, having our seat and office at Emmasingel, Eindhoven, Province of North Brabant, Kingdom of the Netherlands, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to an electromagnetic relay which comprises an energising coil, an iron circuit including a rotatable armature, a movable contact, or contact assembly, and an element coupling the armature with the contact or assembly for transmitting the movement of the armature thereto.

In different applications such relays have to satisfy different requirements, and in view thereof various constructions have been developed. For commercial production it is desirable to utilize only a limited number of different constructions, so that compromise is frequently necessary, with regard to the operation of the contacts, for example, in the majority of relays it is possible to change the number of contacts according to requirements and, in addition, to choose between make contacts and break contacts. It is, however, not commercially practicable to develop a new construction for each of these combinations. The use of a single construction involves, amongst others, the disadvantage that the force needed to drive the contact carrier depends on the number and kind of contacts. It is evident that any compromise involves a loss of some advantages.

The present invention provides an improved construction of a relay, according to which the said disadvantages are obviated and, in addition, other advantages may be obtained.

transmitted from the armature to the contact or contacts is varied in accordance with the selected position of the coupling element in relation to the armature. This results in a construction of which the sensitivity can easily be changed and which can easily be adapted to the desired requirements, so that it is possible fully to utilize the advantage of having only a single type of relay.

The invention may advantageously be used in a relay having a contact assembly which comprises stacked spring contact fingers, which are coupled to the armature by means of a ladder-like coupling element having spaced rungs for moving the contact fingers, said coupling element bearing upon an armature lever arm at a driving point. According to the invention, in this case the driving-point on the armature lever arm can be chosen at different distances from the fulcrum by a displacement of the coupling element. It is thus possible to adapt the driving force to the number of contact springs and to the ratio between the numbers of make contacts and break contacts. The effective length of the lever arm of the armature is made short for break contacts, since the armature is almost fully loaded by the contact springs at the beginning of the stroke. For make contacts the effective length in question is made long because with make contacts the armature is not fully loaded by the contact springs until nearly the end of the stroke. In one advantageous form of construction the adaptation of the effective length of the armature lever-arm to the number and the kind of contacts is obtained by displacing the whole set of contact springs together with the coupling element. The contact assembly is thus always in the same position in relation to the coupling element, so that the contact springs are always acted upon by the rungs of the ladder at the same order.

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displacement of the ladder is used to obtain a change in the sensitivity of the relay.

In order that the invention may be more clearly understood and readily carried into effect, it will now be described more fully with reference to the accompanying drawing.

In Figure 1 a relay is shown, comprising an iron circuit 1 provided with an energising coil 2 and a rockable armature 3. The iron circuit carries a group 4 of four stacked spring contact fingers, which constitute the two pairs of make contacts 6 and 7. The movable spring of each pair is coupled to the armature 3 by means of a ladder-like coupling element 5. The coupling element 5 bears upon a lever arm of the armature at a driving-point 9, and the effective length of the lever arm is the distance between the point 9 and the fulcrum 8 of the armature. The coupling element 5 is so arranged that it can be adjustably displaced in a direction parallel to the longitudinal dimension of the contact springs.

The displacement of the coupling element entails a change in the situation of the driving-point 9, resulting in a change in the effective length of the armature lever arm. Displacing the lever 5 to the right moves the driving-point 9 nearer to the fulcrum 8 of the armature, which is advantageous when the group of the contact springs 4 is interchanged with a similar group having break contacts instead of make contacts. The transmission of the armature movement to the movable contact springs is immediately adapted to the function of the new group of contacts.

By the lateral displacement of the ladder 5 the situation of the points at which the ladder drives the springs 6 and 7 is changed. As this may result in an undesired deflection of the springs it is advantageous to arrange the group of springs in an adjustable manner on the iron circuit, so that when the ladder 5 is displaced the group of springs also can be displaced and the relative position of the group of springs and the ladder can be unaffected.

As is shown in Figure 2, the armature may be provided with notches designed to receive the end of the ladder, or coupling element. The armature shown is provided with two sets of notches 10 and 11 in order to hold the ladder 5 in either of two different positions in relation to the armature. When most of the contact springs actuated by the ladder 5 form make contacts the end of the ladder is advantageously inserted in

the notches 10, whilst when the contact assembly is provided with break contacts the end of the ladder is advantageously positioned in the notches 11. It will be clear that the armature may be provided with a greater number of notches for positioning the ladder 5, thus increasing the adaptability of the device.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. An electromagnetic relay comprising an iron circuit including a rockable armature, an energising coil, a movable contact or contact assembly and an element coupling the armature to the contact or contacts for transmitting the movement of the armature thereto, wherein the coupling element can be adjusted in relation to the armature in such a manner that the velocity-ratio with which movement is transmitted from the armature to the coupling member is varied in accordance with the selected position of the coupling element in relation to the armature.

2. An electromagnetic relay as claimed in Claim 1, wherein the contact assembly comprises stacked spring contact fingers connected to the armature by means of a ladder-like coupling element having spaced rungs for moving the contact fingers and adapted to be driven by an armature lever at a driving-point whose distance from the fulcrum of the lever can be varied.

3. An electromagnetic relay as claimed in Claim 2, in which the contact or assembly is displaceable with respect to the coupling element.

4. An electromagnetic relay as claimed in Claim 2 or 3, in which the armature lever arm is provided with notches into which the end of the coupling element can be selectively inserted at different distances from the fulcrum of the armature.

5. An electromagnetic relay substantially as described with reference to Figure 1 of the accompanying drawing.

6. An electromagnetic relay substantially as described and having an armature substantially as described with reference to Figure 2 of the drawing.

Dated this 14th day of October, 1946.

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[This Drawing is a reproduction of the Original on a reduced scale.]

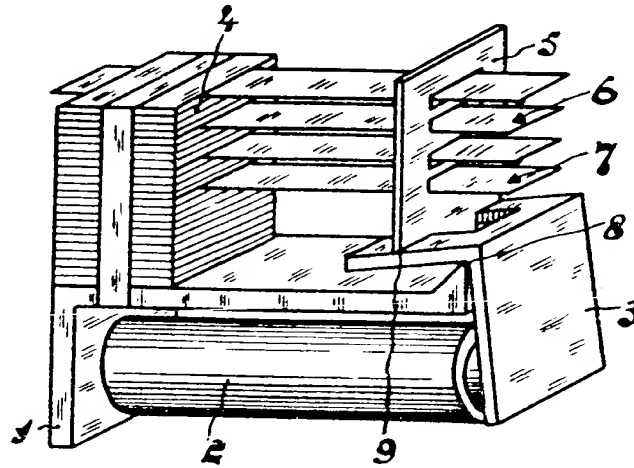


Fig. 1

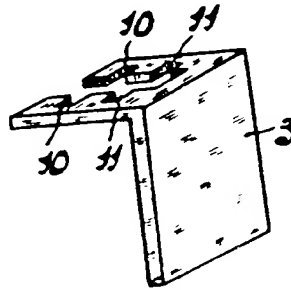


Fig. 2

